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SYSTEM PATHOGENS INHIBITING CONSTRUCTION PROJECT RISK MANAGEMENT PERFORMANCE: DELIBERATE IGNORANCE PERSPECTIVE

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Abstract
Risks have emerged as one of the most significant project management concerns due to their effects on construction project performance. Several literature attributes the increasing consequences of risks to low awareness and ineffective management practices. This paper draws attention to the existence of latent pathogens affecting the efficiency of risk management performance (RMP). The objective was to determine whether construction stakeholders' 'deliberate ignorance' of inherent risk management pathogens classified as complexity, complicatedness, mindlessness, and project pathologies affects RMP. A survey questionnaire administered to 135 certified construction project managers in Nigeria provided the data used for the study. Data analysis engaged descriptive statistics and Fuzzy Set Theory. The result revealed that ineffective RMP arise mainly from factors related to project complexity and mindlessness. Complexity increases project uncertainty without appropriate tools to address them; while the criticality of the relationships between risks elements continuously vary in practice. Mindlessness depicts stakeholders' 'wilful ignorance', biased perception, and mind-set towards risk management. The results suggest that reducing project complexity, biased perceptions and improving stakeholders' capacity would benefit RMP. Therefore, improving the capacity of stakeholders and developing appropriate tools to address the changing nature of risks are areas to improve RMP.

Keywords: Construction industry, construction projects, system pathogens, risk management, risk management performance.

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INTRODUCTION

Risk Management (RM) is undertaken to maximise beneficial opportunities in project delivery. Despite ample standards and techniques of Project Risk Management (PRM), construction projects continuously fail to achieve targeted performance objectives. One of the most significant indicator of RM failure reported across technical literature showed that cost overrun is ubiquitous in almost every construction project (Amadi and Higham, 2016). The effect of RM failure on the identity of project team and professionals in the construction industry, such as loss of reputation is also alarming. These consequences portray severe difficulty in situating inferred stakeholders' claim of extensive application of RM techniques with project management success (Amadi and Higham, 2016). Current risk management indices reported in the literature revealed that stakeholders' degree of responsiveness and application of RM is limited in one way or another, hence, the failure to address project risks comprehensively. Laryea and Hughes (2009) delivered further evidence that the use of analytical risk models is not prevalent among contracting firms in Ghana. Ellis and Wood (2003) likewise revealed that only two RM tools, risk workshop and risk register were prevalent amongst cost consultants in the UK. Therefore, stakeholders' claim to apply formal RM procedures in the construction industry is at best, 'lip service' (Ejowumu, 2014).

Despite plethora of studies on construction RM within project management literature, existing studies seem to elude the prominent dimension of RM performance (Maina *et al*., 2016; Tsiga *et al*., 2017; Kotb and Ghattas, 2017). The performance of existing RM practices in the project environment remain vastly unexplored (Joustra, 2009). Limited literature narrative further exists about the challenges confronting PRM implementation including why project failures persist, despite stakeholders' acclaimed RM efforts. Attempt to examine factors affecting the effectiveness of RMP in Rwanda adopted a single case study and evaluated the effect of two factors only (Maina *et al.*, 2016). Arising from this gap, Tsiga *et al*. (2016) maintained that the research space relating to PRM is still developing. Mir and Pinnington (2014) using data from failed construction projects across the globe also noted that the implementation of PRM is low. Kotb and Ghattas (2017) inferred that many construction organisations are unable to deal with risk effectively, despite implementing RM processes. This paper therefore try to find answer to the research question, what hidden systemic factors relating to the deliberate ignorance of construction stakeholders inhibits PRM performance? Deliberate ignorance means the state of lack of knowledge reserved by exploring explicit reasons to defend what is not known as inappropriate (Kutch and Hall, 2010). This study uses the dimension of deliberate ignorance to espouse why current RM results prevails by reporting stakeholders' actual practice and their limitations hypothesised in the theory of deliberate ignorance.

The paper draws attention to the existence of latent pathogens affecting the efficiency of risk management performance (RMP). The aim of the study was to explain the theoretical imbalance between stated application of RM and actual PRM performance in the construction industry. The objectives determined whether stakeholders' inert ignorance of inherent pathogens classified as complexity, complicatedness, mindlessness, and project pathologies affects RMP. The study therefore offers novel insight to understand why RM failures such as cost and time overruns subsist amidst stakeholder claims to practice RM in project delivery.

REVIEW OF RELATED LITERATURE

Theory of Deliberate Ignorance

The theory of 'deliberate ignorance' stipulates that the act of not knowing is manage by advancing explicit justifications thereby portraying ignorance as irrelevance (Kutch and Hall, 2010). The irrelevance in the context of construction PRM in Nigeria is the perception that related knowledge, awareness and implementation of RM is commonplace across domains (Nnadi and Ugwu, 2013; Amade *et al.,* 2014; Otali and Odesola, 2014; Ejohwomu, 2014; and Adekeke *et al*., 2015). Stakeholders' therefore apply 'acclaimed' implementation of PRM as a 'defence mechanism' to decimate the need to improve performance of RM. Kutch and Hall (2010) explained that deliberate ignorance exist not because the information is missing or wrong (error), but because, certain information is unimportant, irrelevant and as result, overlooked. Persistent cases of project failures in terms of cost, time and quality are seminal evidences which portrays PRM are overlooked (Higham and Amadi, 2016; Amadi and Omotayo, 2017). Elfaki and Alatawi (2015) buttressed that poor performance in key project management areas are outcomes of failure to document and report properly, knowledge and other expert inputs and barriers inhibiting performance. Busby and Zhang (2008) theorised that deliberate ignorance are internal processes that regulate external factors in project management, and that 'system pathogens' are inherently regular mechanics of internal project organisations. The term pathogen describes hidden conditions of a system that is largely unnoticed until failure is evidenced (Love *et al*., 2012). These hidden conditions are integral part of a functional RM practice lying unnoticed over time, and they inhibit best practices thereby prompting other deficiencies that lead to chronic consequences such as cost and time overruns in the project delivery stage (Amadi and Omotayo, 2017).

Deliberate Ignorance and Risk Management Performance

Bedford and Cook (2013) described the study of ignorance and its cultural production using Agnotology. The concept is appropriate to explain contentious RM failures in behavioural terms. The term ignorance is the 'lack of knowledge' (Teller *et al.,* 2014). Scholars including Kutsch and Hall (2010) have found this definition useful but inadequate since ignorance has multiple dimensions. Based on Smithson's (1989) analogy, two dimensions of ignorance exists that is, ignorance of error and irrelevance. However, Kustch and Hall (2010) posited that two dimensions of ignorance apply to project risk management (PRM) namely: deliberate ignorance and ignorance as an affective impulse. The term deliberate ignorance refers 'irrelevance that may be managed through the application of specific defence mechanisms' (Smithson, 1989). Kutsch and Hall (2010) explained that deliberate ignorance exist not because the material is lost or incorrect (error), but because, certain information is deemed unimportant. Ignorance of affective impulse means that the occurrence of error is beyond control. However, the lack of control does not assume moderation over the extent in which stakeholders choose to consider risk data as immaterial.

This research is theorised on 'deliberate ignorance rather than error'. The postulation is to admit that ignorance is inert in the affective judgment of inferred stakeholder undertaking RM. Therefore, the bane of RM failure is an ignorance of know-how in precise analysis of risk information. Various factors therefore interlaced to increase the chances of varying perception of risk information in PRM. Previous attempts to situate these dimensions within project management as 'ignorance' relied mainly on assumptions. Kustch and Hall (2010) employed interview techniques to establish that untopicality, undecidability and taboo are conventional in RM, but did not explore their manifestation in PRM scenarios. This study therefore postulates that abysmal performance of risk management practices develop from the ignorance of limited information, subjectivism and erroneous irrelevance developing from broad range of interrelated issues.

Ramasesh and Browning (2014) account for related problem using four project factors namely: complexity, complicatedness, mindlessness, and project pathologies. Complexity refers to number, variety, and criticality of relationships in project elements. Complicatedness explains the lack of capacity and experience, interactions and divergent viewpoints among construction stakeholders. Mindlessness explains wilful or deliberate ignorance and entrapped mind-set of relevant stakeholders**.** Project pathologies explain the dimensions of incompatible project sub-systems, disjointed knowledge, uncertain prospects and non-functional organisation culture. This follows literature position (Busby and Zhang, 2008), that devious risks originate from divergent values and frames of stakeholders, high-level policy-making, and dependent on literature guidance. Joustra (2009) contributed that the effectiveness of RM is determined by the ability to answer questions related to why,

what, when, who, and how? Yauger (2017) summed that construction stakeholders tend to focus on how to develop risk register with no concrete response plan to curb actual occurrence. Azman *et al.* (2013) also established that construction stakeholders are hesitant to adopt new methods of managing risk. Table 1 presents factor relating to each dimension of complexity, complicatedness, mindlessness, and project pathologies.

Table 1: Categorisation of Deliberate Ignorance Influencing RM Performance

Complexity	**Complicatedness**	**Mindlessness**	**Project Pathologies**
The number, variety, and criticality of relationship in project elements	Lack of capacity and experience, interactions and divergent viewpoints among construction stakeholders	Wilful or deliberate ignorance and entrapped mind-set of relevant stakeholders	Incompatible project sub-systems, disjointed knowledge, uncertain prospects and non-functional organisation culture
Variables and Sources	Variables and Sources	Variables and Sources	Variables and Sources
1. Increased uncertainty in projects and lack of tool to address them (Osipova and Eriksson, 2013) 2. Confusion between project and portfolio risk management (Van Os *et al*. 2015). 3. Rigid and centralised project management structure (Joustra, 2009). 4. Lack of defined standards to manage risk (Kutch and Hall, 2009). 5. Inadequate planning, poor stakeholder mapping, incomplete scope, irrelevant assumptions and poor communication (Jensen, 2014; Kotb and Ghattas, 2017)	1. Dearth of knowledge and uncertainties on the fitness of tools (Akintoye and Macleod, 1997). 2. Variation in the conceptualisation of risk (Van *et al*., 2015). 3. Risk plan not revised to accommodate changes (Atasoy, 2007). 4. Forecasted risks matrix not compared with actual incidences (Atasoy, 2007). 5. Inability to transform risk processes and techniques to practice (Joustra, 2009). 6. Poor risk identification (Kleffner and Campbell, 2012; Kotb and Ghattas, 2017).	1. Lack of awareness, familiarity and ignorance of doubt (Akintoye and Macleod, 1997). 2. Deliberately withholding information to save project (Van Os *et al*. 2015). 3. High cost of RM implementation (Joustra, 2009). 4. Perception that RM is an add-on service (Hillson, 2003). 5. Short-term focus, bias and RM orientation (APM, 2013; Kotb and Ghattas, 2017).	1. Subjective-intuitive-based assessment (Otali and Odesola, 2014; and Amade *et al*., 2015 2. Tools generate unrealistic estimate and information. 3. Prevalence of advance tools (Stalker, 2003; Manning, 2008; Laryea and Hughes, 2008; Zhang, 2011). 4. Stand-alone individual practice (Osipova and Eriksson, 2013). 5. Tools unable to address changes in risk across project phases (Shi *et al.* 2015). 6. Lack of management support, poor incentive, organizational culture and RM systems (Kotb and Ghattas, 2017)

RESEARCH METHODOLOGY

The study was a descriptive survey conducted in the Nigerian construction industry. The trajectory is that pathogens are commonplace within the PRM system in construction project delivery, and stakeholders have failed to recognise and improved their contributions to current level of PRM practice. Through the survey, the study documented and analysed construction project managers' perceptions about perceived 'hidden pathogens' operationalised within PRM system using Fussy Set Theory. To obtain the requisite data, a sample frame of certified project managers with relevant accredited bodies such as PMP and Prince2 in Nigeria was drawn-up. The preliminary inquiry to the desk offices of these bodies revealed 4,050 up-to-date registered members are resident in the country, but only 23 percent are mainstream operators in the construction industry. The population of the study was 932, and comprised quantity surveyors, builders, architects, engineers, procurement officers and allied professionals practicing as project managers. The sample size was determined from this population using

formula developed by Leslie Kish in 1965. Although the sample size was 91, the questionnaire was however, sent to 135 respondents randomly with a view to overcome the problem of non-response bias.

The questionnaire comprised four questions in which three elicited respondents' demographic information, while question four obtained ranked perception about factors inhibiting RMP using five-point Likert scale. The questionnaire administration combined two strategies comprising face-to-face and emailing. The survey recorded the response rate of 70.3 percent corresponding to 95 valid responses. The dimensions of internal and external reliability were also evaluated using Lee Cronbach test. The result yielded Cronbach Alpha > 0.81, and this is an indication of strong reliability and coherency of both the measurement constructs and data collection instrument.

Data analysis involved percentages and Fuzzy Set Theory (FST). FST determined the criticality of factors contributing to deliberate ignorance that affects RMP. Studies by Shen *et al.* (2012) and Yadollahi *et al.* (2014) delivered comprehensive narrations related to the theories of FST and its presentation in evaluating performance. The tool addressed fuzziness in subjective ranking using four basic steps. (1) calculation of mean and standard deviation (SD), (2) determination of Z score (Mean-3/SD), (3) determining degree of membership using Excel NORMDIST function, and (4) setting benchmark to select critical factors (Ekung and Adu, 2018) and identification of critical factors in which 0.85 benchmark was adopted (Yadollahi *et al*., 2014). Scores 0.85 to 1.00 indicated full membership and critical deliberate ignorance factor affecting RMP.

RESULTS ANALYSIS AND DISCUSSIONS

Respondents' Background Information

The study examined the respondents' suitability to provide valid opinion about RMP using two dimensions, professional qualification and years of experience. The distribution of the sample (Table 2) portrays homogeneity between the population of quantity surveyors and other professionals. High level of involvement of quantity surveyors in the study is attributable to their increasing participation in project management services in the Nigerian construction industry. The population of Builders, Architects and Engineers are likewise heterogeneous in the sample. The sample also shows that a segment of non-construction professionals is performing project management functions in the industry (7 percent). The years of experience of respondents are also significant; the proportion of respondents with years of experience above five years constitutes 89 percent. Within this population, 53 percent have over 15 years of project management experiences. The respondents also have appropriate educational and professional qualifications in project management and mainstream built environment skill areas. Those with PMP qualification constitutes eighty percent of the sample, while another 20 percent had Prince2 certification. The respondents are also qualified to practice their respective professions simultaneously with project management (85 percent), while 15 percent are probationers. Sixty percent of the respondents also have minimum of first and post graduate degrees, while 40 percent have Higher National Diploma and Bachelor of Science degree respectively. The combined attributes of educational and professional qualifications of the respondents demonstrated relevance to accept the study's data as valid opinion of project managers relating to critical factors inhibiting RMP.

Table 2: Respondents' Characteristics

Professions			**Experience in Project Management.**			**Qualification**		
Variables	N	%	Variables	N	%	PMP	76	80
Q. Surveyors	38	40	0-5years	20	21	Prince2	19	20
Architects	10	11	5-10years	25	26	Corporate Members	85	89
Builders	25	26	10-15years	15	16	Probationers	10	11
Engineers	15	16	15-20years	25	26	HND BSC only	38	40
Allied Professional	7	7	20 and above	10	11	MSC and Above	57	60
Total	**95**	**100**	**Total**	**95**	**100**	**Total**	**95**	**100**

N = Numbers; % = Percentage; Pjt. = Project; Mgt. = Management

Factors Inhibiting Risk Management Performance

The study determined the impact of 27 factors on RMP using ranked ordered (ordinal) data. The factors, as CPX1-8 (complexity), CPC1-7 (complicatedness), MNS1-6 (mindlessness), and PPA1-6 (project pathologies). Table three presents the result of respondents' perception transformed using FST. The result of the transformed perceptions of the respondents reveals that 18 factors (67 percent) out of 27 are critical latent pathogens affecting RMP with λ-cut greater than 0.85 (see methodologies). Further details indicate that factors relating to project complexity constitute the most significant dimension of deliberate ignorance affecting RMP. Seventy five percent that is, six out of eight factors in this category were critical pathogens influencing RMP. The second most significant dimension of deliberate ignorance inhibiting RMP is complicatedness. Sixty-seven percent out of seven

variables used to evaluate the dimension of complicatedness were critical. Mindlessness is the third most significant dimension of deliberate ignorance affecting RMP. Six variables underwrite mindlessness, but three (50 percent) were critical pathogens inhibiting RMP. The last significant dimension is project pathologies, and three (50 percent) out of six variables were critical pathogens underpinning RMP. Non-critical factors also deserve in-depth review in order not to generate ignorance of irrelevance due to false hypothesis. This is because, twenty-Seven variables were ranked above average (mean item score greater than 3.00 - Table 3) as potential critical pathogens undermining RMP.

Discussion of Results

The study reveals that poor Risk Management Performance (RMP) in the construction industry persisted due to factors arising from failure of professionals' to tackle four dimensions of deliberate ignorance critical to RMP. The results showed that current practice of RM among construction professionals is prejudiced with varying elements of ignorance. The factors popularly held in ignorance from the dimension of complicatedness include variation in the conceptualisation of risk among stakeholders, lack of embedded knowledge of RM, and inappropriate translation of RM theory to practice. These factors contribute to dearth of experience, capacity, and divergent viewpoints among inferred stakeholders. The result also showed that complexity arise from increasing nature of uncertainty in projects, lack of tools to address uncertainty, rigid RM structure and culture, inadequate planning, poor communication, inability to map relevant risks, and providing excessive irrelevant information. The result of these factors meant that the number, variety, and criticality of relationships between risk elements vary. Ignorance of mindlessness similarly, arise from inherent lack of awareness and familiarity, overture of personal opinion over others, non-disclosure of relevant information about risks, excessive imagination, focus on short-term risks only and cognitive bias. These variables portray that stakeholders' perception and their mind-sets about RM are biased. Stakeholders in the study area are further unable to harmonise divergent backgrounds, practices, and experiences of stakeholders to benefit RM, and their practices show penchant to excessive standardisation of RM processes. These groups of factors constitute project pathologies affecting RMP in the construction industry.

The total number of variables examined, the number validated critical inhibitors of RMP (Table 3) and their proportion are summarised in Table 4. The following section presents a synthesis of four categories of critical factors affecting RMP in details.

a. Knowledge and Awareness Dearth

Although, the knowledge of RM practices spread across construction industry domain, stakeholders' acclaimed awareness and knowledge strongly rely on literature guidance, and not global best practices. The result for MNS1 (lack of awareness, familiarity, and ignorance of doubt), rated insignificant, suggests deposit of ignorant of RM best practices. On the other hand, dearth of knowledge and uncertainties on the fitness of tools (0.89 > 0.85) showed significant rating. Stakeholders therefore need to develop relevant knowledge about the functionality of RM tools. This finding agrees with the study of Farrokshand *et al.* (2016), which reported that existing RM practices are objective decision tools by passive construction stakeholders. In addition, by not performing PRM using existing tools, construction stakeholders invariably demonstrate passive behaviour towards PRM. A study by Manning (2008) confirmed that most organisations accept certain management tools to create public impression, but not used to improve business internal and external environment. RM in the Nigerian construction industry is unstructured due to 'lack and losses of knowledge during projects implementation (Adeleke *et al.*, 2015). Whilst unboxing the claims that detailed RM apply, the result portrays beneficial opportunity to pave way for appropriate learning towards improved practice.

Table 3: System Pathogens Affecting Risk Management Performance

Code	RM Performance Inhibitive Factors	MIS	SD	Z Scores	M(xi)	Decision
CPX1	Increased uncertainty in projects and lack of tool to address them	3.89	0.90	1.11	0.87	✓
CPX2	Confusion between project and portfolio risk management	3.23	0.83	0.22	0.59	-
CPX3	Rigid and centralised project management structure	3.67	1.33	1.79	0.96	✓
CPX4	Lack of defined standards to manage risk	3.88	0.99	1.35	0.91	✓
CPX5	Lack of structured framework to implement RM	3.78	0.78	0.57	0.72	-
CPX6	Inability to identify relevant stakeholders	3.60	1.00	1.10	0.86	✓
CPX7	Providing too little or much and missing requirements	3.80	0.93	1.11	0.87	✓
CPX8	Ineffective communication among stakeholders	3.69	1.10	1.42	0.92	✓

CPC1	Dearth of knowledge and uncertainties on the fitness of tools	4.02	0.90	1.24	0.89	✓
CPC2	Variation in conceptualisation of risk	4.00	0.85	1.06	0.86	✓
CPC3	Risk plan not revised to accommodate changes	3.98	0.81	0.89	0.81	✓
CPC4	Forecasted risks matrix not compared with actual incidences	3.94	0.80	0.82	0.79	-
CPC5	Inability to transform risk processes and techniques to practice	3.84	0.98	1.29	0.90	✓
CPC6	Poor risk identification	3.72	0.91	0.97	0.83	-
CPC7	Excessive assumptions and focus on short term issues	3..91	1.00	1.49	0.93	✓
MNS1	Lack of awareness and familiarity and ignorance of doubt	3.82	0.88	0.98	0.84	-
MNS2	Deliberate withholding information to save project	3.77	1.02	1.32	0.91	✓
MNS3	High cost of RM implementation	3.23	0.87	0.36	0.64	-
MNS4	Perception that RM is an add-on service	3.69	0.56	-0.77	0.22	-
MNS5	Inability to imagine fully futuristic event	3.80	1.02	1.35	0.91	✓
MNS6	Overture of personal opinion and pushing individual view based personal experience	3.96	1.00	1.46	0.93	✓
PPA1	Divergent background, training, knowledge and perception of risks	4.08	0.94	1.42	0.92	✓
PPA2	Excessive standardization of processes and use of advanced tools	3.70	1.32	1.81	0.96	✓
PPA3	Tools generates unrealistic estimate and information	3.45	1.40	0.86	0.81	-
PPA4	Lack of embedded risk management culture	3.90	0.97	0.90	0.82	-
PPA5	Lack of management support	3.79	1.03	1.36	0.91	✓
PPA6	Cultural orientation towards RM	3.65	1.39	0.89	0.81	-

✓ = Critical Factors; - = Not Critical Factors MIS = mean item score; M (xi) = Level of association.

The significance of this theme arise from the following variables: dearth of knowledge and uncertainties on the fitness of tools (0.89 > 0.85), providing too little or much and missing requirements (0.87 > 0.85), risk plan not revised to accommodate changes (0.86 > 0.85), and inability to transform risk processes and techniques to practice (0.90 > 0.85). Excessive assumptions and focus on short-term issues (0.93 > 0.85), inability to imagine fully futuristic event (0.91 > 0.85), overture of personal opinion and pushing individual view based personal experience (0.93 > 0.85), and divergent background, training, knowledge and perception of risks (0.92 > 0.85) were also significant factors supporting this theme. The significance of these variables indicate low level of adoption and varying degree of RM knowledge among construction stakeholders.

Table 4: Comparison of Critical RMP Inhibitors

S/N	System Pathologies	Total No of Factors	No of Critical Factors	FST
1	Complexity	8	6	75.00%
2	Complicatedness	7	5	71.00%
3	Mindlessness	6	4	50.00%
4	Project Pathologies	6	3	50.00%
5	Overall performance predictability			67.00%

b. Tools and Methodological Concerns

System pathogens inhibiting RMP relating to tools and methodological concerns in the construction industry consists of several factors namely: fragmented expertise, use of advanced tools, and excessive inclination to subjective RM. Fragmented expertise in RM is counterproductive due to its inability to offer comprehensive and balanced conception of risk devoid of biases. The pertinence of this variable draw support from the RM structure adopted by organisations. Fragmented RM separates party's roles in risk identification, assessment, analysis and mitigation. Emerging thinking in PRM in the construction industry increasingly discouraged this approach in favour of mutual risk management. System pathogens relating to this theme include overture of personal opinion and pushing individual view based on personal experience (0.93 > 0.85), lack of management support (0.91 > 0.85), divergent background, training, knowledge and perception of risk (0.92 > 0.85), and deliberate withholding

information to save project (0.91 > 0.85). Others critical factors in this category also include excessive assumptions and focus on short term issues (0.93 > 0.85), inability to transform risk processes and techniques to practice (0.90 > 0.85), variation in the conceptualisation of risk (0.86 > 0.85), ineffective communication among stakeholders (0.92 > 0.85), and providing too little or much thereby missing requirements (0.87 > 0.85). In contrast to disciplinary or fragmented expertise in risk management, collaborative/mutual risk management is a more beneficial approach because, variation in risk conception is a correlate of the level of understanding, knowledge, duties, tasks, and concern of integrated parties (Van Os *et al.,* 2015). The study by Osipova and Eriksson (2013) also corroborated this assertion, and confirmed that collaborative RM is an imperative strategy to bridge inherent lapses in RM practice. Stand-alone conception of risk also generates varying understandings, which are themselves, problem centres, therefore, interdisciplinary actions helps to balance these variations. Tsiga *et al*. (2017) also buttressed the imperative of interactive actions in RM by stating that personality traits needed for effective RM are not resident in an individual. In the opinion of Busby and Zhang (2008), stakeholders needs to be clear about risk to them and risks to others, while Ejohwomu (2014) obtained that lack of cooperative construction RM in the construction sector in Nigeria is seminal. A blend of various personality traits could therefore bridge the gap arising from the inefficiency of others.

Existing RM approaches, in addition to supporting separation between quantitative and qualitative assessment, are also inept to address changing nature of risk across project phases. Stakeholders' ranking of CPC4 (forecasted risks matrix not compared with actual incidences) as insignificant pathogens affecting RMP (0.79 < 0.85) portrays deliberate ignorance about the changing nature of risks in practice. In contrast, related results such as 'increased uncertainty in projects and lack of tool to address them, providing too little or much thereby missing requirements, variation in conceptualisation of risk, inability to transform risk processes and techniques to practice, inability to imagine fully futuristic event, and lack of management support are significant methodological pathogens (scores > 0.85), inhibiting RMP. The result is consistent with the findings of Osipova and Eriksson (2013), which reported that risks vary across project implementation phases. The changing nature of risk across project phases also imposes the requirement for continuous adjustment over the project's life cycle, and this dimension is a significant factors affecting RMP (CPC4 and CPC5-Table 3). Although, advanced tools can simulate different scenarios for individual risks, these tools are also criticised for being mere decision-making apparatuses but not used in real-life projects (Table 3; CPC1; Manning, 2008; and Farrokshand *et al*., 2016). Shi *et al*. (2015) also agreed with the dynamic nature of risks, and recommended, phasing of projects for effective risk management. The changing nature of risk also suggests that their mitigation strategies are not necessarily constant, but requires continuous adjustment. It is therefore not a surprise, why existing practice involving one-time analysis and recommendation of mitigation strategies are ineffective.

Another seminal methodological concern is penchant to the use of subjective-intuitive based assessment of risk. Results (PPA2 and PPA3-Table 3) relate to the use of standardised processes and tools in PRM, and respondents' views about the severity of these factors are significant (scores > 0.85). The use of standardised RM tool has gained significant adoption in the context of developing countries where risk premium, contingency allowance is prevalent (Otali and Odesola, 2014; Amade *et al*., 2015). Laryea and Hughes (2009) showed that the use of analytical risk model was not prevalent among contracting firms in Ghana. The study by Akintoye and Macleod (1997) also linked low adoption of risk analysis to ignorance of applied tools, and ignorance of doubt about their suitability (see also result of CPC1; 0.89 > 0.85). Vast refinement is therefore, needed to improve the uses of applied tools in RM to benefit the practice in the construction industry (Ekung and Adu, 2018). However, Laryea and Hughes (2008) postulated that RM may not benefit specific project context because, advanced tools are used where personalised tools are more desirous (see PPA2; PPA3, scores > 0.85-Table 3). The study by Stalker (2003) also reprised similar viewpoint and noted that 'scientific and technical approaches' to RM are ineffective because, they tend to isolate perceptions about risk from obtainable practices. In a related study, Osipova and Eriksson (2013) found that 'formal' risk management tools are inadequate to address uncertainty in projects. In addition, ineffective risk management underpins poor risk identification, and RM tool have hidden weaknesses (Kotb and Ghattas, 2017; Ekung and Adu, 2018). The result for PPA2 and PPA3, values > 0.85 however, differs from the position held by Beck (1992). Beck (1992) asserted that the effectiveness of RM is unconnected with use of advance tools. This study concludes that since different tools generate varying outcomes, applied RM tools are correlate of RMP.

c. Bureaucratic and Rigid Standardisation of Risk Processes

Bureaucratic and non-flexible risk management (RM) structure, culture and orientation is significant pathogens associated with ineffective RMP that construction stakeholders have failed to reckon. Flexible structure assists to ensure effective communication, while rigid RM structure obstructs information flow within internal and external project organisation that could assist to identify project risks. The results of rigid and centralised project management structure (0.96 > 0.85) is a significant pathogens affecting RMP. Ejohwomu (2014) confirmed that absence of structured RM system is missing in the construction sector in Nigeria. The importance of effective

communication between parties for effective RM exists in the literature (Nnadi and Ugwu, 2013). This study therefore posits that there is possible confusion and deliberate ignorance about the structural arrangement needed to implement RM among stakeholders. However, when rigid and centralised project management structure is examine in the mind of traditional project management organisation, prevalent across the construction industry, the results of the study seem consistent. This however calls for decoupling of standardised RM structure to apply unstructured approaches for easy implementation. The result under this factor is comparable to the finding in Joustra (2009). Respondents in Joustra (2009) emphasised that the infusion of flexibility in RM processes are 'boring'. The findings reported in Joustra (2009) also indicates lack of mechanics for effective communication, control and lack of reinforced commitment to address risk in practice (see also the result of CPX8; 0.92 > 0.85). The study by Zhang (2011) supported this result, which indicated that applicable RM approaches lean towards standardisation. This understanding implies that RM is a generic practice that is value-neutral, and suggest that RM is distinct from people's minds and values systems (Stalker, 2003). Based on explorative case study within contracting sector, Joustra (2009) also maintained that effective implementation of RM requires liberalisation of increasingly centralised activities of the construction industry. Flexible RM processes and standards are therefore correlates of effective RMP.

d. Centralised Risk Management Structure

The nature of organisation structure is also a significant factor inhibiting RM. Kutch and Hall (2010) indicated that RM structure vary across organisations. A centralised organisation structure inhibits the involvement of relevant stakeholders. The result, 'inability to identify relevant stakeholders (0.86 > 0.85)' supports this assertion. In the contracting sector, risk assessment is performed at management level during tender adjudication only; this practice excludes others managers in the middle and lower cadre. The lower and middle management level however, possess relevant information about project risks from past projects implementation. Many stakeholders regards RM as a specialist activity - being an add-on service to mainstream project management processes (Hillson, 2003). The perception of the respondents in this study however differ from stated viewpoint. The variable 'perception that RM is an add-on service' received the overall least ranking (0.22 < 0.85). The foregoing viewpoints therefore recognises the expanding interests to examine the realities of RM theory and practices more closely for beneficial results.

CONCLUSIONS

This paper draws attention of construction stakeholders to the existence of deliberately ignored system pathogens underpinning why construction projects continuously fail to meet targeted objectives. The study documented inherent limitations in stakeholders' actual risk management practice hypothesised in the theory of deliberate ignorance. The system pathogens are therefore integral part of a functional risk management practice lying unnoticed over time; but inhibiting best practices and prompt other deficiencies that contribute to chronic consequences such as cost and time overruns. Twenty-seven factors relating to project complexity, complicatedness, mindlessness and project pathologies evaluated for degree of association with risk management failure in construction project delivery using Fussy Set Theory. The findings of the study revealed that poor risk management performance arise mainly from factors relating to project complexity and complicatedness. Complexity increases uncertainty in projects without appropriate tools to address them, and further explains that the number, variety, criticality of relationships between projects elements vary. Complicatedness on the other hand, arise from wilful ignorance, such as lack of awareness, ignorance of doubt, lack of information, excessive imagination, focus on short term issues, and lack of motivation and cognitive biases. Mindlessness therefore portrays prejudice in stakeholders' perceptions and mind-sets about risk management because of inadequate experience and capacity, the interaction during risk management is likewise subject to divergent viewpoints. Improvement to risk management performance must improve level of awareness, project information, risk management tools, and limit imagination and biases, and improving these dimensions would generate 67 percent increase in project cost and time performance.

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